A DRUM

This invention is related to a drum used in washing/drying machines and preferably in front-loading washing machines that comprise of a torque transmitter to transmit the motor drive power.

In the state of the art, washing machines, preferably the laundry washing machines include a fixed tub and a drum, which rotates inside the tub. Problems arise in the transmission of torque from the motor during the rotation of the drums which are made of non-metal, for example plastic material instead of commonly used metal material, because the total center of gravity of the rotating objects, around the axis of the shaft of the drum moves away from the axis of rotation during the washing, as a result of the unbalanced distribution of the laundry inside the rotating drum. Due to this unbalance, a high amount of centrifugal force is created and which in return causes problems in the resistance of the components of the entire laundry machine and especially the resistance of the fixed tub and the rotating drum. On the other hand, strengthening the drum/shaft counting required, ensuring instant right and left rotations of the drum.

In European Patent No. 04722840, it is disclosed that during the production of the drum plastic material will be injected, after the shaft is placed into the mould.

The object of this invention is to realize a drum, preferably for washing machines preferably made of plastic material which includes a torque transmitter, integrated thereto to distribute drive power received from a motor to the entire drum, rotating around its central axis.

The drum, realized to attain the object of this invention, has been illustrated in the attached drawings wherein;

Figure 1 is the schematic view of a washing/drying machine, including a drum and a tub.

Figure 2 is the three dimensional view of the drum including a torque distributor.

Figure 3 is the perspective cross-sectional view of a drum including a torque distributor.

Figure 4 is the three dimensional back view of a torque transmitter.

Figure 5 is the three dimensional side view of a torque transmitter.

Figure 6 is the exploded back view of a torque transmitter including a shaft, a bushing and a torque distributor.

Figure 7 is the exploded front view of a torque transmitter including a shaft, a bushing and a torque distributor.

Figure 8 is the three dimensional back view of a torque transmitter, including angular transmitter support elements and circular transmitter support element and perforations on the plate.

Figure 9 is the three dimensional rear view of a torque transmitter, without a plate and which includes the angular transmitter support elements and circular transmitter support element.

Figure 10 is the three dimensional back view of a torque transmitter, without a circular transmitter support element and on the angular transmitter support element.

Figure 11 is the three dimensional back view of a torque transmitter, without a circular transmitter support element and a plate and perforations on angular transmitter support elements.

Figure 12a is the three dimensional view of a torque transmitter in the shape of a triangular prism, having perforated recesses and protrusions on it.

Figure 12b is the exploded view of a drum having a torque transmitter in the shape of a triangular prism, with perforated recesses and protrusions and a rear surface with recesses and protrusions in the shape of triangular prisms.

Figure 13a is the three dimensional view of a torque transmitter including a cavity and several angular transmitter support elements, attached to a plate, with a diameter smaller than the drum.

Figure 13b is the three dimensional view of a torque transmitter including a cavity and several angular transmitter support elements, attached to a plate with the same diameter of the drum.

The components shown in the drawings have been numbered as follows:

1. Washing/drying machine
2. Tub
3. Drum
4. Torque transmitter
5. Shaft
6. Bushing
7. Torque distributor
8. Angular transmitting support element
9. Circular transmitting support element
10. Mould positioning extension
11. Plate
12. Perforations
13. Recess
14. Protrusion
15. Cavity

The washing/drying machines (1), preferably front loading washing machines comprise a motor which provides the operation, a fixed tub (2), into which the washing fluid is flown, and a drum (3) rotated by the motor around the axis of the machine within the tub (2) for the laundry to be placed.

The drum (3) is made of a non-metal material preferably a plastic material, which does not have a good adhesion to metal.

The drum (3) includes a torque transmitter (4) on its rear wall which transmits the drive power received from the motor for rotation. The torque transmitter (4), comprises a shaft (5), driven by the motor and a torque distributor (7) which distributes the drive power, received from the shaft (5) to the drum as a whole (3), by the help of drum's rear wall (3).

The torque transmitter (4) is fully or partially inserted into the rear wall of the drum (3), in such a manner that it will not separate from the drum (3).

The torque distributor (7) comprises a mould positioning extension (10), to allow the torque transmitter (4), to be positioned and inserted into the right place in the mould in which the drum will be produced.

In the preferred embodiment, the drum (3) is produced by plastic injection moulding method. The torque transmitter (4) is placed into the mould, by the help of the mould positioning extension (10) while the drum (3) is being produced. The plastic material is injected into the mould and the integration of the torque transmitter (4) onto the rear wall of the drum (3) is provided.

In an embodiment of the invention, the torque distributor (7) comprises several angular transmitting support elements (8) to provide the drive power received from the motor by the help of the shaft (5) and to be transmitted to the whole of the drum (3), by the help of the drum's rear wall where the shaft (5) is present, and towards the sides.

In another embodiment of the invention, the torque distributor (7), includes a plate (11), with either a straight or a curved surface to transmit the drive power received from the motor by means of the shaft (5) to whole drum (3), by the help of the rear wall of the drum (3).

In another embodiment of the invention, the torque distributor (7) includes one or more circular transmitting support elements (9), which transmit the drive power received by means of the shaft (5) from the motor, to the whole drum (3). By means of the rear wall of the drum (3) the material, which forms the drum (3), shrinks when it transforms to the solid phase from the liquid phase during the production of the drum (3), whereas the torque distributor (7) does not exhibit any shrinkage at all. Thus, circular transmitter support element (9) prevents the drum (3) to crack and becoming useless while it is taken out of the mould. The circular transmitting support element (9) is preferably used together with the plate (11) and/or the angular transmitting support element (8).

In another embodiment of the invention, the angular transmitting support element (8) and/or the circular transmitting support element (9), and/or the connecting plate (11) comprise one or more perforations (12) to prevent the torque distributor (4) separate from the drum (3) by releasing the material surrounding the torque distributor (7) while the torque transmitter rotates the drum.

In another embodiment of the invention, the plate (11) comprises several recesses (13) and protrusions, preferably in a form to match the shape of the rear wall of the drum (3), which provides the functions of the angular transmitting support element (8) and/or the circular transmitter support element (9).

In another embodiment of the invention, the plate (11) includes one or more cavities (15) on it. In this embodiment, the angular transmitting supports (8), positioned on the side where the cavities (15) are provided to connect the plate (11) and the shaft (5) together.

The dimension of the torque transmitter (4) may vary according to its placement position and size of the drum (3). A torque transmitter (4), which is of the same diameter with the drum (3), can be integrated into the rear wall of the drum. On the other hand, the torque transmitter (4) may be of smaller diameter than the diameter of the drum made of materials of various structure and size (Fig. 13a, 13b).

The torque distributor (7) is produced preferably of aluminum material to reduce weight and to increase resistance, whereas the shaft (5) is produced preferably of steel so as not to be affected by the torque values that are exerted on it.

In another embodiment of the invention, the torque transmitter (4), includes a bushing (6) having a smooth surface and preferably made of brass which provides the shaft (5) and the torque distributor (7), to be installed onto each other or which provides the formation of a step on the shaft (5).

In another embodiment, the torque distributor (7) and the shaft (5) are produced as a single piece to form the torque transmitter (4).